

REMARKS

This amendment under 37 CFR § 1.111 is submitted in response to the outstanding Official Action mailed October 4, 2006. In view of the above claim amendments and the following remarks, reconsideration and allowance of this application are respectfully requested.

Claims 1, 9, 12, 27, 31, 34, and 37 have been amended to more particularly point out and distinctly claim the invention. Claims 3 and 29 are cancelled. Claims 1 and 27 have been amended to express the amount of lithium borate relative to the amount of cathode-active material. Support for these amendments is found at, for example, Figures 2, 4, and 5; and previously pending claim 27. Claims 9 and 34 have been amended to clarify that the carbonaceous insertion compound anode is a lithiated carbonaceous insertion compound anode, support for which is found at paragraph 29 of the specification as filed. No new matter has been added.

Claims 1, 3, 7-13, 27, 29, and 31-38 are rejected for lack of written description under 35 U.S.C. § 112, first paragraph, because claims 1 and 27 recite “an aqueous 0.05% to 0.15wt% lithium borate solution,” which is allegedly not supported by the specification as filed. However, claims 1 and 27 are amended to express the amount of lithium borate relative to the amount of cathode-active material. The Office Action indicates that this subject matter is supported by the as-filed specification. (See Office Action, pp. 2-3). Therefore, this rejection is traversed and reconsideration and withdrawal of the rejection by the Examiner is respectfully requested.

Claims 3, 9, 10, 12, 13, 29, 34, 35, 37, and 38 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 9, 10, 34, and 35 have been amended to recite that the anode comprises a lithiated carbonaceous insertion compound. Claims 12 and 37 have been amended to incorporate the language suggested in the Office Action. (See Office Action, p. 3). Furthermore, claims 3 and 29 are cancelled. Therefore, this rejection is traversed and reconsideration and withdrawal of the rejection by the Examiner is respectfully requested.

Claims 1, 3, 7-12, 27, 29, and 31-37 are rejected under 35 U.S.C. §102(b)/103(a) as allegedly being anticipated by, and alternatively unpatentable over, Uehara et al., JP 09-330720.

This rejection is respectfully traversed in view of the above claim amendments for the following reasons.

Independent claims 1 and 27 have been amended to more particularly point out and distinctly claim the invention of the present application, and to further distinguish the invention over the disclosure of Uehara et al. Claim 1 has been amended to limit the lithium borate to 0.05 to 0.15 wt% lithium borate relative to the weight of the cathode-active material, while claim 27 remains directed to a lithium borate concentration of about 0.01% to about 0.15% by weight of the cathode-active material. The claims which depend from independent claims 1 and 27 also include these limitations. Claims 1 and 27, as well as claims 7-12 and 30-37 depending therefrom, are therefore not anticipated by Uehara et al. under 35 U.S.C. §102(b).

Additionally, the claims are also not obvious in view of Uehara et al., which only specifies a heating temperature of 650°C for the mixture of a cathode powder and a lithium boron nitride compound in the preparation of a battery cathode. The rejection in view of Uehara et al. is respectfully traversed because the preparation of the cathode in the battery of the present invention provides unexpected results in view of Uehara et al. Further, in view of Uehara, one of skill in the art would not expect a lithium borate hydrate to produce a suitable cathode for a battery having reduced capacity fade rate during cycling. Uehara does not disclose or suggest a lithium borate hydrate.

One of skill in the art would not expect the lithium boron/lithium insertion compound cathode heated at only a maximum of 450°C in the present application to provide a battery having a reduced capacity fade rate during cycling in view of Uehara et al. Uehara discloses no range of temperatures for this heating process. In fact, Uehara consistently designates 650°C throughout the examples, which teaches away from the lower temperature range of 250°C to 450°C.

By contrast, Figures 2, 4, and 5 of the originally-filed specification demonstrate improved capacity fade rate for batteries containing 0.05 to 0.15 wt% lithium borate relative to the amount of cathode-active material prepared with a heating temperature of between 250 and 450°C over the untreated control. Figure 5, in particular, illustrates capacity fade rate improvements exhibited by LiCoO₂-type cathode-active materials treated with lithium borate between 250 and

450°C in comparison to capacity fade rate of the same material treated with lithium borate at 650°C, as disclosed by Uehara et al. The temperature difference creates physical differences in the lithium borate coated cathode-active materials reflected in the improvement in capacity fade rate. These physical differences cannot be expressed other than with a product-by-process limitation, which thereby serves to define the physical structure of the claimed materials over the physical structure of the cited prior art materials.

“The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially . . . where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product.” MPEP § 2113 (citing *In re Garnero*, 162 USPQ 221, 223 (CCPA 1979)). Therefore, the product-by-process limitations should be given patentable weight because they define the conditions under which a product with a physical structure having unexpectedly better properties (e.g. better capacity fade rate) may be prepared. Therefore, in view of the results depicted in Figure 5, Claims 1 and 27, as well as claims 7-12 and 30-37 depending therefrom, patentably define over Uehara et al. under 35 U.S.C. §103(a). Reconsideration by the Examiner and withdrawal of this rejection is therefore respectfully requested.

The Examiner also rejected claims 13 and 38 under 35 U.S.C. §103(a) as being unpatentable over Uehara et al. in view of Gosho et al., U.S. Patent No. 6,589,694. The Examiner acknowledges that Uehara et al. did not teach the electrolyte solvent of claims 13 and 38, but cited Gosho et al. as teaching this limitation. This rejection is respectfully traversed for the reasons set forth hereinafter.

Claims 13 and 38 depend from claims 1 and 27, respectively, and are directed to allowable subject matter of claims 1 and 27 for the reasons discussed above. The combination of Uehara et al. and Gosho et al. does not render claims 13 and 38 obvious because both references use a heating temperature of 650°C or higher. Because the use of lower heating temperatures produces a cathode active material with decreased capacity fade rate in comparison to the prior art temperatures employed, claims 13 and 38 are patentable over the cited combination of Uehara et al. in view of Gosho et al. under 35 U.S.C. §103(a). Reconsideration by the Examiner and withdrawal of this rejection is therefore respectfully requested.

CONCLUSION

In view of the above claim amendments and remarks, it is believed that this application is now in condition for allowance. Reconsideration is respectfully requested. The Examiner is invited to telephone the undersigned if there are any remaining issues in this application to be resolved. Finally, if there are any additional charges, the Examiner is authorized to charge applicants' Deposit Account No. 19-5425 therefor.

Respectfully submitted,

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